The Rosalind and Morris Goodman Cancer Research Centre

Annual Report

January – December 2014
**Executive Summary**

The **Rosalind and Morris Goodman Cancer Research Centre** (GCRC) is a world-recognized Centre of excellence that supports high caliber research within state-of-the-art facilities. Its mission encompasses: 1) **research** aimed at improving the understanding and treatment of cancer through excellence in fundamental and translational research programs, 2) **training** the next generation of cancer researchers and 3) **public outreach** that educates the lay population on the importance, value and successes of cancer research in treatment of this disease.

In 2014, the GCRC completed a strategic planning exercise spearheaded by Dr. Morag Park, the GCRC’s Director, to ensure GCRC’s positioning as a top research centre in the world, while at the same time, aligning its vision with that of McGill University. The GCRC held its annual retreat in October 2014. The primary focus of this one-day event was to finalize the discussions of the Centre’s strategic priorities and to draft a plan of action to implement these initiatives.

Thus, the priorities of the GCRC are focused on the establishment of comprehensive and multidisciplinary research programs to develop a mechanistic understanding of cancer genomes and how tumours resist and adapt to therapeutic interventions. These approaches require support through advanced computational analyses of complex data towards developing new therapeutic strategies based on this molecular information. The GCRC is well-positioned to extract what this information means by pursuing basic research that is focused on 1) understanding and integrating genomic changes to signal networks at the cellular and organismal level, 2) analyzing interactions of tumor cells with their host microenvironments, 3) applying systems approaches to identify tumor cell vulnerabilities and metabolic adaptations in response to therapies; this together with sophisticated computational analysis of complex data and translational research aimed at developing preclinical animal and human cancer-derived models will allow to test novel therapeutic strategies. To achieve these objectives, the Centre will prioritize the recruitment of new principal investigators and trainees with bioinformatics, computational biology and cancer systems genomics and metabolomics expertise.

The core research activities at GCRC are propelled by GCRC faculty members who are tenured and are members of ten different Departments (Biochemistry, Oncology, Medicine, Physiology, Microbiology & Immunology, Anatomy & Cell Biology, Human Genetics, Surgery, Pathology, and Computer Science) as well as the Cancer Axis of the McGill University Hospital Centre (MUHC). A complete list of GCRC members can be found at the following website: [http://www.mcgillgcrc.com/index.php?option=com_content&view=article&id=13&Itemid=142](http://www.mcgillgcrc.com/index.php?option=com_content&view=article&id=13&Itemid=142).

The scientific impact of their research is reflected by numerous publications, continued success in securing competitive funding and attracting talented trainees. In 2014, the GCRC had 25 associate members, 31 adjunct members, 45 MSc students (8 graduated), 79 Ph.D. students (9 graduated), 45 postdoctoral fellows (6 completed their training), and 14 summer students. Despite narrow budgetary limits and national economic constrains the Centre continued to deliver more with less due to its lean policy and dedicated administrative supervision.
The GCRC continued its comprehensive search for a candidate for the Lung Cancer Research Chair. This endowed chair, established by the Goodman Family, will support an established clinician/scientist whose work will bridge clinical and basic research in the field of lung cancer. It is projected that the recruitment of the desired candidate will be completed in 2015.

In line with the Faculty of Medicine’s initiative and roll out of the Administrative Centres of Excellence (AEC), the GCRC completed the overhaul of its administrative structure. A dedicated AEC, AEC12, commenced administering GCRC’s finances and HR activities in October 2014. Petra Gaiser became the Associate Director, Bruceil McKay a finance officer, Elio Scardellato was hired as an HR advisor and Ginette Berube, Neena Bindra (new-comer) and Catherine Robinson became team members.

Of importance, the Goodman Cancer Research Centre participated in the comprehensive review of the Life Sciences Complex. The Goodman Cancer Research Centre was one of the 5 inaugural themes on which the Life Sciences Complex was built and as such it submitted a report that spanned the years 2008 – 2014.

Research and Publications

Achievements with the most significant impact:

Members of the GCRC have made significant contributions to cancer research in the past year. Those included: deciphering the fundamental roles for mRNA translational machinery in cancer progression (Sonenberg, Cell, Cell Stem Cell 2014), discovering a unique therapeutic opportunity in Multiple Myeloma through the inhibition of eIF4E, a regulator of protein synthesis (Pelletier, PNAS 2014); defining the contribution of alterations in the RNAi processing machinery (Duchaine, Nature Rev. Cancer 2014), elucidating important signaling pathways that control cell polarity during very early embryonic development (Yamanaka, Development 2014), unraveling mechanisms for non-oncogene addiction in cancer by the DNA repair gene CUX, (Nepveu, review Nat Rev Cancer 2014) and effects of Met inhibition on drug resistance in gastric cancer (Park, Sci Signal 2014). Enhanced subtyping strategies for breast cancer and outcomes have been described (Hallett, Cell Reports 2014, J Clin. Oncology 2014). Several key molecules involved in breast cancer metastasis were discovered and detailed molecular and phenotypic characterization of one of them, GPNMB, provided the clinical hypotheses for the development of a novel antibody conjugate in development by an industrial partner (Siegel/Celldex, J Clin Oncology 2014). Synthetic lethality approaches have led to the discovery of several anti-cancer agents with unique mechanisms of action with the ability to reverse therapeutic resistance and to promote cancer cell death (Shore/Roulston, Cancer Research 2014). Investigators working on cellular plasticity and somatic cell reprogramming to pluripotency have revealed an important role for mRNA translation in this process (Sonenberg, Yang, Teodoro and Yamanaka, Cell Stem Cell, 2014). Another successful project with high clinical relevance is related to the muscle-wasting syndrome – cachexia – observed in nearly 60% of cancer patients and which often causes painful inflammation. New insights into muscle fiber formation reveal potential targets...
for the development of novel treatments that will prolong and improve the quality of life for cancer patients (Gallouzi, *Nature Communications* 2014).

Recent findings of the Oncometabolism team have provided insight into the coupling of oncogenic cell signaling and metabolic programs that fuel growth, survival and metastatic progression of cancer cells. Novel pathways of metabolic adaptation and stress resistance in tumour cells have been identified, (*Pause, J Clin Invest, 2014*) (*Jones, PNAS, 2014*) (*Pause and Jones, PLoS Genetics, 2014*). Collaborative studies identified regulators of mechanisms of action of the biguanide, metformin (*St-Pierre and Pollak, Cancer Metab. 2014*). These converging concepts position the field of cellular and whole organism bioenergetics at the forefront of cancer research and highlight the impact of the GCRC investigators on this emerging field. In fact, in 2014 the Cell Metabolism journal, while celebrating 10 years of publishing scientific reports in metabolic biology, has identified the top 10 breakthroughs in Cancer Metabolism. One of these publications describes work performed at the GCRC in the laboratory of Dr. Russell Jones (*Cell Metab. 2013 Jan 8;17 (1):113-24*).

Together, the scientific impact and productivity of GCRC researchers cuts across diverse fields of cancer research. It is demonstrated by the number and caliber of publications in peer review journals and by the number of collaborations that are ongoing between members of the Centre and national or international collaborators.

Thus in 2014:

- Nearly 40% of those are published in journals with an impact factor over 10 ([Nature Journals (14), Cell Journals (10), PLoS Journals (10) Cancer and Oncology Journals (16), PNAS (4)]).
- 11 out of 25 researchers (44%) had 5 or more publications demonstrating high productivity for GCRC research staff.
- More importantly, the dynamic collaborative work, which has been a prime focus and strongly encouraged, was evidenced by 19 joint publications.

All research (individual, team, and infrastructure) and administrative activities in the Centre are supported by grants secured and held by the GCRC associate members (25 members). The funding comes from Canadian federal and provincial granting agencies (CIHR, FRQS, NSERC, CQDM, FPQS), international funding agencies (NIH-USA), dedicated foundations/societies (CFI, Terry Fox Foundation, CCSRI, CRS, PCC, KFoC, SG Komen, Richard and Edith Strauss Canada Foundation, Azrieli Foundation; Leukemia & Lymphoma Society of Canada) or industry partnerships (Eli Lilly, L’Oreal, Therillia, Merck Sharpe & Dohme Corp., Blueline Biosciences).

**Individual research grants:**

- Total new grant dollars secured in 2014: $10,633,166
- Number of new grants secured: 35 (23% of total grants held)
- Number of PIs who secured new funding in 2014: 19 out of 25 GCRC members (76%)
- Total grants held by 25 GCRC associate members: 154
• Individual grant dollars held in 2014: $14,846,122

**Multidisciplinary grants:**
Multi-disciplinary interactions between the members of GCRC and those from Biomedical Engineering are enhanced by joint research awards offered by the Centre. In 2014, two Townshend/Lamarre Innovative Research Awards were granted via competitive process to:

- **Drs. Jose Teodoro (GCRC) and Jay Nadeau (Biomedical Engineering)** for a project entitled “Use of targeted ultra-small nanogold particles for the treatment of cancer”.
- **Drs. Morag Park (GCRC) and Joseph Kinsella (Biomedical Engineering)** for a project entitled “Breast tumour-stroma interactions in 3D printed matrices”.

**Team grants:**
The success of the GCRC and its members can also be measured by the team spirit as evidenced by the significant track record in team funding which is sustained through submission of new grant applications. In 2014, the GCRC applied for three major team grants/strategic initiatives:

- **The Terry Fox New Frontiers Program Project Grant** on “Unraveling metabolic adaptations associated with disease progression and therapeutic response in metastatic breast cancer”; PI: Dr. M. Park; Funding period applied for: 2014 – 2019. Funding received: $750,000 for one year.
- **The Terry Fox New Frontiers Program Project Grant** on “Oncometabolism and the Molecular Pathways that Fuel Cancer”; PI: Dr. V. Giguère; Funding period applied for: 2015 – 2020; Total amount requested $ 7,457,960; Decision expected in June 2015.
- **CFI grant application** on “Targeting the Tumour Microenvironment: Bridging Basic Science and Therapy”; PI: Dr. Morag Park; Infrastructure grant; Total amount requested $5,974,598. Decision: Awarded.

**Infrastructure grants:**

- GCRC maintained the prestigious Fonds de recherche du Québec – Santé (FRQS) research group status in 2014 supported by $340,000 (initial budget $450,000 reduced due to province-wide budget cuts). This funding was renewed until 2017.
- GCRC continued to manage the McGill Integrated Cancer Research Training Program (MICRTP), which was initiated in 2009. The program has been financially viable thanks to a CIHR/FRQS training grant (Tremblay/Miller; FRN# 52888; $325,000; 2009-2015) and a financial support from the GCRC, the Segal Cancer Centre (SCC), the MUHC-RI, and McGill’s Faculty of Medicine. In 2014, thanks to this initiative, 34 trainees received partial salary support while pursuing cancer research at the GCRC, SCC and MUHC-RI sites. In addition, 25 undergraduate students completed summer research training internships while 20 graduate students and postdoctoral fellows benefited from travel support to national and international scientific meetings.

**Patents:**
**Dr. Michel L. Tremblay** applied for:

1) US Provisional Patent Application No: 61/757,403 submitted 2014; Title: CNNM AND CNNM/PTP4A-BASED SCREENING ASSAYS; Applicant: The Royal Institution for the Advancement of Learning/McGill University/ Tremblay ML et al.
2) U.S. Provisional/Patent application No: P2678US00 submitted Feb 25th 2014; Title: **TC-PTP INHIBITORS AS APC ACTIVATORS FOR IMMUNOTHERAPY.** Michel L Tremblay, Claudia Penafuerte, Matthew Feldhammer, George Zogopoulos, Cameron Black, Sheldon Crane, Vouy-Linh Truong, Brian Kennedy.

**Conferences and Symposia:**

GCRC scientists are highly recognized for their expertise and are invited to give presentations at many important national and international conferences as experts in their fields. They are also actively participating at departmental seminars and numerous workshops not only at McGill but also other universities.

**Invitations of great significance:**

- **Dr. Nahum Sonenberg** was
  - a Keynote Speaker at the Terry Fox Node Research Symposium. December 8, 2014; Toronto, Ontario. Title of the presentation: *The role, of the mRNA 5’cap-binding protein, eIF4E, in tumourigenesis and metastasis*.
  - a Distinguished Speaker at the LARP Society Conference. September 3, 2014. Airlie, Virginia. Title: *LARP1 controls 5’TOP mRNA translation downstream of mTORC1*.

- **Dr. Jerry Pelletier** was
  - invited in a role of educator about the biology of target translation initiation as an anti-cancer treatment approach and as an advisor on intellectual property landscape, potential business opportunity, and competitive intelligence by Windamere Venture Partners.
  - a Keynote Speaker at the Symposium on RNA and Cancer. November 14, 2014; Toulouse, France. Title: *Targeting Deregulated Translation in Cancer*.
  - a Keynote Speaker at Victoria University, Center for Biodiscovery Symposium. November 26, 2014; Wellington, New Zealand. Title: *Targeting Deregulated Translation in Cancer*.

- **Dr. Morag Park** was
  - an invited Speaker and session chair at the “Cancer Targets and Therapeutics” Meeting, Cold Spring Harbor Laboratories; August 22, 2014, NY, USA: Title of the presentation: *Basal breast cancer: The Met receptor tyrosine kinase, EMT and HIPPO Cancer Targets and Therapeutics*.
  - an Invited Speaker and session chair, at the FASEB Conferences on “Protein Phosphorylation, cellular plasticity and signaling rewiring”. July 22, 2014; Snowmass, CO, USA. Title: *Feedback inhibition, rewiring and synergies with Met signaling modules*.
  - a Keynote Speaker at the LSU Health Sciences Center, Feist-Weiller Cancer Center at the Ray A Barlow Scientific symposium. May 16, 2014; Shreveport, LA, USA. Title: *Basal Breast Cancer: The met receptor tyrosine kinase, EMT and HIPPO*.

- **Dr. Alain Nepveu** was
  - a Keynote Speaker at the Memorial University of Newfoundland at the Biochemistry Summer Symposium. August 13, 2014; St. John’s Newfoundland and Labrador. Title: *A Strange Case of Dr. Jekyll and Mr. Hyde: CUX1, a Haploinsufficient Tumour Suppressor Gene Overexpressed in Advanced Cancers*. 

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In addition, the GCRC members were involved in the organization of the national and international scientific conferences and/or symposia.

**Scientific meeting organization:**

- **Dr. Maxime Bouchard** was the organizer of one of the 27eme Entretiens Jacques Cartier symposia dedicated to "Stem Cells and Cancer"; October 6-7, 2014; Montreal, Quebec.

- **Dr. Nahum Sonenberg** was a co-organizer with D. Tollervey, J. Steitz and A. Ephrussi for 2014 EMBO/EMBL Symposium: "Complex Life of mRNA". October 5-8, 2014; Heidelberg, Germany.

- **Dr. Michel L. Tremblay** was meeting co-organizer of 1) the 7th International Congress of Pathophysiology focused on Molecular Mechanisms In System Pathologies, Host-Pathogen Interactions, Strategies And Tools In Diagnostics And Therapeutics; September 4-7, 2014; Rabat, Morocco, 2) the 2nd Cancer Cachexia Conference: Evolving Mechanisms and Therapies; September 26-28, 2014; Montreal, Quebec, and 3) held a one-day symposium on the topic of stem cells in physiology and disease; McGill University; November 24, 2014. From this meeting, Dr. Tremblay prepared and submitted a document on the status of stem cell research and regenerative medicine at McGill University entitled: “Stem Cells McGill”, to the Faculty of Medicine.

- **Dr. Morag Park** was invited to be a member of the scientific organizing committee for the AACR Annual Meeting Program, Committee for System Biology for the 2015 meeting; Philadelphia, USA.

- **Drs. Arnim Pause and Ivan Topisirovic** organized the biannual “Cancer Research Colloquy: Facilitating collaborations through discussions” which took place on December 19, 2014. This joint initiative between the GCRC and Lady Davis Institute for Medical Research aims to provide a platform for scientific exchanges between each institute's scientists in an intimate setting.

**Teaching and Learning**

Maintaining research excellence within GCRC depends on the ability to recruit and train outstanding graduate students and postdoctoral fellows. Training of HQP is a major goal of the Centre and is supported by CFI investments in its core facilities, which are integrated into the GCRC’s research training mission. Individual research training is achieved in our research laboratories and through proactive collaborations in research projects. The training experience is enriched by a seminar program in cancer research that is integrated with the LSC seminar series. In 2014 a total of 12 Seminars, delivered by national and international speakers, were organized by the GCRC for the scientific community at the GCRC and the LSC.

The Centre continues to provide a rich and stimulating training environment. In 2014 all of our scientists taught in various undergraduate/graduate level courses, served as course coordinators or on academic advisory and examining boards, as well as supervised and mentored graduate and postdoctoral trainees.
Important accomplishments:

- **Drs. Nicole Beauchemin and Magdalena Maslowska** participated in discussions and preparation of a position paper about the importance and impact of the Strategic Cancer Research Training Programs. These pan-Canadian programs, which are now terminated, have been implemented and supported by CIHR funding since 2000. The publication entitled "From solo in the silo to strategic training programs" has been submitted and is under review in "Life Sciences Education" (Authors: Marianne Koritzinsky, C. Anne Koch, Barbara Riley, Nicole Beauchemin, Gerry Johnston, Michael Johnston, James Koropatnick, Carmen Loiselle, Magdalena Maslowska, Craig McCormick, Lois Mulligan and Ming Tsao).

- **Dr. Russell Jones** received the Dr. Ann Wechsler Award for Excellence in the Teaching of Physiology. The award was established by students from the Department of Physiology and is given annually for outstanding teaching in their department.

- **Dr. Thomas Duchaine** has designed, and is leading “Spotlight @GCRC”, a new seminar series where successful research stories are presented by GCRC trainees alongside seasoned researchers to GCRC and Life Sciences Complex audiences. To achieve wide exposure, the GCRC’s Atrium is converted into a dynamic gathering place thanks to generous support from Fluidigm Inc. Graduate students, Alyssa Smith (PhD; laboratory of Dr. G. Zogopoulos) and Ruba Halalou (PhD; laboratory of Dr. L. McCaffrey) are in charge of the annual program and organizing pertinent logistics.

GCRC trainees continue to excell in their research programs. Their success stories are measured by their publication record, presentations at the scientific meetings, and numerous awards. Some of the 2014 highlights include:

**Student success stories:**

- **Genevieve Deblois**, PhD candidate from the laboratory of Dr. Vincent Giguère, won the Governor General Gold Medal for outstanding PhD thesis.

- **Valerie Vinette**, PhD candidate from the laboratory of Dr. Michel L. Tremblay, received the 2014 Norman Zavalkoff Family Foundation Travel and Research Award to work on a collaborative research project developed by Drs. Michel L. Tremblay (GCRC) and Talia Volk (Weizmann Institute of Science, Israel). Project: “The role of protein tyrosine phosphatases in the regulation of colorectal cancer cell metabolism”; Location: the M.D. Moross Institute for Cancer Research at Weizmann in Israel; December 3-18, 2014.

- **Fanny Dupuy**, PhD candidate from the laboratory of Dr. Peter Siegel, in her role as a Director of Science and Policy Exchange (SPE) organized the 5th annual SPE conference focused on the global theme of innovation and the potential for innovative endeavors in Québec and Canada. The conference was held on October 3rd, 2014. The Science & Policy Exchange (SPE) is a student-led non-profit organization with full charity status, spearheading initiatives directly engaging Québec’s leaders. The SPE provides a much-needed forum of debate to guide changes and growth in Québec’s policies for scientific issues.
- **Dmitri Kharitidis**, PhD Candidate from the laboratory of Dr. Arnim Pause, entered the Breast Cancer Start-up Challenge in 2013. His team has won the Phase II (Business Plan) of the competition and was the only Canadian Team passing onto Phase 3 of the competition. The Breast Cancer Start-up Challenge is an international competition launched by the Center for Advancing Innovation, Avon Foundation and NIH to stimulate entrepreneurship among young people.

- **Alison Hirukawa**, PhD candidate from the laboratory of Dr. William Muller, entered the Neuro Start-up Challenge in 2014 by building a multi-disciplinary team (Vigilance Diagnostic) and developed a business plan around NIH inventions available for licensing. The team has won the Phase 1 (Elevator Speech) of the challenge in December 2014. The team moved onto Phase 2 (Business Plan) and the results will be announced shortly. The competition is supported by the Center for Advancing innovation, the Heritage Provide Network and the NIH.

Furthermore, Graduate Students and Postdoctoral Fellows apply for external stipend funding from various sources such as federal and provincial funding agencies, independent foundations, McGill University (Faculty of Medicine and Individual Departments) and GCRC (internal funding). In 2014 many GCRC trainees successfully secured a total of $635,375 of new funding and held a total of $943,296:

- New Funding secured from federal and provincial agencies: $229,500 (Total held: $586,913)
- New Funding secured from McGill: $142,375 (Total held: $112,174)
- New Funding secured from GCRC internal awards: $263,500 (Total held: $244,209)

Moreover, over 25 trainees have received internal funding support in the form of travel awards to present their research findings at the national and international meetings.

**IN Volvement in the Community**

GCRC members participate significantly in numerous scientific and academic committees, from internal McGill committees to grant review panels, journal editorial boards, industrial advisory board meetings, and organizing committees for international scientific meetings in cancer, signaling and development. Moreover, members also play leadership roles in strategic cancer research plans for Canada. Of note, several GCRC members take part in industry consulting activities and scientific advisory boards. This confidential information is submitted as part of the Consulting Activities Table.

The Centre continues to be actively committed to organizing and participating in outreach activities that benefit the general public. Noteworthy initiatives in 2014 include:

**Young Woman in Bio 2014:** The GCRC and Young Women in Bio organized a workshop, to be offered annually, to encourage young women to explore fields of study in science, technology, engineering, and mathematics as well as to learn about science careers. Led and organized by the GCRC’s female graduate students (Juliana Blagih, Ruba Halouai, Azadeh Arabzadeh, Sylvia
Andrzejewski, Laura Forrest, and Alyssa Smith), the first event hosted 15 high school students on March 24th, 2014.

**Public Lectures 2014:** Organized annually by Drs. Nicole Beauchemin and Peter Siegel, the popular Public Lectures series are offered to the general public four times per year.

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<th>Date</th>
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<td>11/25/2014</td>
<td>Technology Meets Cancer Diagnosis and Therapy: Who would have thought?</td>
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<td>Te Vuong, MD, FRCP</td>
<td>Contribution of radiation technologies in the management of patients with rectal cancer</td>
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<td>Sylvain Martel, B Eng, PhD, FCAE</td>
<td>The optimal therapeutic delivery vehicle for cancer therapy: a gift from nature</td>
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<td>David Juncker, PhD</td>
<td>Biochip technologies to expose cancer's signature in blood</td>
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<td>10/21/2014</td>
<td>From Bench to Bedside: Local Discoveries with Global Impact</td>
<td>Nicole Beauchemin, PhD</td>
<td>Gordon Shore, PhD</td>
<td>Confronting the genetic complexities of cancer: new therapeutic strategies</td>
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<td>Marc Therrien, PhD</td>
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<td>Gerry Batist, MD, FRCPC(C), FACP</td>
<td>ExACCT Initiative: a new paradigm in new cancer treatments and implementations</td>
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<td>April Rose, MDCM, PhD</td>
<td>Targeting GPNMB to treat breast cancer and melanoma: from bench to bedside and back again</td>
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<td>5/27/2014</td>
<td>Cancer Prevention: Incurable to Incredible</td>
<td>Nicole Beauchemin, PhD</td>
<td>Michael Pollak, MD</td>
<td>New ideas in cancer prevention</td>
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<td>Koren Kathleen-Mann, PhD</td>
<td>Environmental causes of cancer</td>
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<td>Dr. Arnim Pause, Associate Professor, received tenure and was promoted to Full Professor in June 2014.</td>
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<td>Dr. Connie Krawczyk, Assistant Professor in the Department of Microbiology and Immunology, joined GCRC as an associate member and moved her laboratory (5 graduate students, 2 postdoctoral fellows) onto GCRC premises in August 2014. Her research program focuses on dendritic cells and immune response and as such she brings increased expertise to the tumor-host microenvironment and immune evasion, which is one of the GCRC’s research priorities.</td>
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<td>Dr. Christiane Maroun was recruited as an Associate Director of Partnerships and Strategic Initiatives to oversee the development of industrial partnerships between the GCRC’s members and commercial entities with a goal of accelerating translation of basic cancer research discoveries to the clinic. Dr. Maroun is a translational research expert with strong background in cancer biology and immunology and extensive experience in drug discovery and development. She has spent past 8 years at MethylGene Inc. in a leadership role.</td>
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<td>Dr. Maxime Bouchard: recipient of FRQS-Senior Research Scholar Award – FRQS.</td>
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• **Dr. Phil Branton:** recipient of 1) *Lifetime Achievement Award* - Oncology Department, McGill; 2) *Officer of the Order of Canada* - by Her Majesty Queen Elizabeth II - Established in 1967, the Order of Canada is the cornerstone of the Canadian Honours System, and recognizes outstanding achievement, dedication to the community and service to the nation.

• **Dr. Russell Jones:** recipient of 1) *Bernard and Francine Dorval Prize* - Canadian Cancer Society – given for outstanding contributions to basic biomedical research and that have the potential to lead to, or have led to, better understanding of cancer, improved cancer treatments and cures; 2) *William Dawson Scholar Award (2014-2019)* – McGill University – recognizes a scholar developing into an outstanding and original researcher of world-class caliber who is poised to become a leader in his or her field.

• **Dr. Morag Park:** was nominated the *Chair of the American Association for Cancer Research (AACR) Tumor Microenvironment Network* – the network provides an opportunity for a diverse group of scientists with a common interest in the tumor microenvironment to guide the AACR in its mission to prevent and cure cancer by activities directed at understanding the impact of the microenvironment on cancer initiation and progression.

• **Dr. Peter Siegel:** recipient of *William Dawson Scholar Award (2014-2019)* – McGill University – recognizes a scholar developing into an outstanding and original researcher of world-class caliber who is poised to become a leader in his or her field.

• **Dr. Julie St-Pierre:** recipient of 1) *Maude Abbott Prize* – Faculty of Medicine, McGill University – given to a woman scientist for an outstanding record of achievement in either teaching, research or by an exemplary commitment to the University; 2) *FRQS-Junior 2 Research Scholar Award* – FRQS.

• **Dr. Nahum Sonenberg:** recipient of *Wolf Prize in Medicine* for the discovery of the proteins that control the protein expression mechanism and their operation - Wolf Foundation in Israel – the prize is awarded annually and is considered second in importance to the Nobel Prize.